FIRE-RESISTANCE TEST ON
FIRE COLLARS PROTECTING A CONCRETE SLAB PENETRATED BY SERVICES

Report number FSP 1367
CSIRO job number SP3265
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Client
SNAP FIRE SYSTEMS PTY LTD.

Commercial-in-confidence

CSIRO – MATERIALS SCIENCE AND ENGINEERING
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SPONSORED INVESTIGATION No. FSP 1367

FIRE-RESISTANCE TEST ON FIRE COLLARS PROTECTING A CONCRETE SLAB PENETRATED BY SERVICES

SUMMARY

IDENTIFICATION OF SPECIMEN:

The sponsor identified the specimen as Snap Cast-in Fire Collars protecting a concrete slab penetrated by six Polyethylene pipes.

SPONSOR: Snap Fire Systems Pty Ltd
448 Newman Road
Geebung QLD

MANUFACTURER: Snap Fire Systems Pty Ltd
448 Newman Road
Geebung QLD

TEST STANDARD: Australian Standard 1530, Methods for fire tests on building materials, components and structures, Part 4-2005, Fire-resistance tests of elements of construction.

TEST NUMBER: FS 4077/3265

TEST DATE: The fire-resistance test was conducted on 13 August 2009.

DESCRIPTION OF SPECIMEN:

GENERAL

The specimen comprised a 1150-mm x 1150-mm x 150-mm thick reinforced concrete slab penetrated by six Polyethylene pipes protected by cast-in Snap Fire System fire collars. The fire collars were cast into the 150-mm thick slab.

For the purpose of the test, the specimens were referenced as Penetrations 1, 2, 3, 4, 5 and 6.

Penetration 1 – Cast-in SNAP (H/L) 100 FWS fire collar protecting a nominal 110-mm PE pipe

The SNAP (H/L) 100 FWS fire collar consisted of a 1.5-mm thick polypropylene case, 140-mm diameter and 95-mm high, excluding the top cone. The total height of the collar was 285-mm. The collar incorporated three springs; these were pivoted at the top of the spring cavity and restrained by a nylon fusible link with a melting temperature of 75 ℃. A soft intumescent wrap, 4-mm thick x 85-mm wide and weighing approximately 150 grams lined the internal circumference of the collar. The collar was cast into the concrete slab with its base flush with the underside.

The penetrating service comprised a nominally 110-mm OD PE pipe of SDR7.4 with a wall thickness of 15-mm, fitted through the collar's sleeve. The pipe projected vertically, approximately 2000-mm above the concrete slab and approximately 500-mm into the furnace chamber. The pipe was supported at nominally 1000-mm from the unexposed face of the concrete slab. The pipe was open at the unexposed end and capped on the exposed end with a ceramic fibre plug.

Penetration 2 – Cast-in SNAP METAL 160 fire collar protecting a nominal 160-mm PE pipe

The SNAP METAL 160 fire collar consisted of a 1.2-mm thick steel case, 190-mm diameter and 130-mm high. The collar incorporated four springs; these were pivoted at the top of the spring cavity and restrained by a nylon fusible link with a melting temperature of 75 ℃. A soft intumescent wrap, 6-mm thick x 127-mm wide and weighing approximately 300 grams lined the internal circumference of the collar. The collar was cast into the concrete slab with its base flush with the underside. On the unexposed face of the concrete slab, a 25-mm high x 50-mm wide concrete hob was cast around half of the pipe's circumference, to increase the total thickness of the slab to approximately 175-mm.

The penetrating service comprised a nominally 160-mm OD PE pipe of SDR7.4 with a wall thickness of 23-mm, fitted through the collar's sleeve. The pipe projected vertically, approximately 2000-mm above the concrete slab and approximately 500-mm into the furnace chamber. The pipe was supported at nominally 1000-mm from the unexposed face of the concrete slab. The pipe was open at the unexposed end and capped on the exposed end with a ceramic fibre plug.

Penetration 3 – Cast-in SNAP (H/L) 100 FWS fire collar protecting a nominal 50-mm PE pipe

The SNAP (H/L) 100 FWS fire collar consisted of a 1.5-mm thick polypropylene case, 140-mm diameter and 95-mm high, excluding the top cone. The total height of the collar was 285-mm. The collar incorporated three springs; these were pivoted at the top of the spring cavity and restrained by a nylon fusible link with a melting temperature of 75 ℃. A soft intumescent wrap, 4-mm thick x 85-mm wide and weighing approximately 150 grams lined the internal circumference of

the collar. The collar was cast into the concrete slab with its base flush with the underside.

The penetrating service comprised a nominally 50-mm OD PE pipe of SDR7.4 with a wall thickness of 8-mm, fitted through the collar's sleeve. The pipe projected vertically, approximately 2000-mm above the concrete slab and approximately 500-mm into the furnace chamber. The pipe was supported at nominally 1000-mm from the unexposed face of the concrete slab. The pipe was open at the unexposed end and capped on the exposed end with a ceramic fibre plug.

Penetration 4 – Cast-in SNAP METAL 125 fire collar protecting a nominal 125-mm PE pipe

The SNAP METAL 125 fire collar consisted of a 1.2-mm thick steel case, 140-mm diameter and 130-mm high. The collar incorporated four springs; these were pivoted at the top of the spring cavity and restrained by a nylon fusible link with a melting temperature of 75 ℃. A soft intumescent wrap, 6-mm thick x 127-mm wide and weighing approximately 250 grams lined the internal circumference of the collar. The collar was cast into the concrete slab with its base flush with the underside. On the unexposed face of the concrete slab, a 25-mm high x 50-mm wide concrete hob was cast around half of the pipe's circumference, to increase the total thickness of the slab to approximately 175-mm.

The penetrating service comprised a nominally 125-mm OD PE pipe of SDR7.4 with a wall thickness of 18-mm, fitted through the collar's sleeve. The pipe projected vertically, approximately 2000-mm above the concrete slab and approximately 500-mm into the furnace chamber. The pipe was supported at nominally 1000-mm from the unexposed face of the concrete slab. The pipe was open at the unexposed end and capped on the exposed end with a ceramic fibre plug.

Penetration 5 – Cast-in SNAP (H/L) 50 FWS fire collar protecting a nominal 20-mm PE pipe

The SNAP (H/L) 50 FWS fire collar consisted of a 1.5-mm thick polypropylene case, 78-mm diameter and 75-mm high, excluding the top cone. The total height of the collar was 182-mm. The collar incorporated three springs; these were pivoted at the top of the spring cavity and restrained by a nylon fusible link with a melting temperature of 75 ℃. A soft intumescent wrap, 4-mm thick x 57-mm wide and weighing approximately 60 grams lined the internal circumference of the collar. The collar was cast into the concrete slab with its base flush with the underside.

The penetrating service comprised a nominally 20-mm OD PE pipe of SDR7.4 with a wall thickness of 4-mm, fitted through the collar's sleeve. The pipe projected vertically, approximately 2000-mm above the concrete slab and approximately 500-mm into the furnace chamber. The pipe was supported at nominally 1000-mm from the unexposed face of the concrete slab. The pipe was open at the unexposed end and capped on the exposed end with a ceramic fibre plug.

Penetration 6 – Cast-in SNAP (H/L) 50 FWS fire collar protecting a nominal 50-mm PE pipe

The SNAP (H/L) 50 FWS fire collar consisted of a 1.5-mm thick polypropylene case, 78-mm diameter and 75-mm high, excluding the top cone. The total height of the collar was 182-mm. The collar incorporated three springs; these were pivoted at the top of the spring cavity and restrained by a nylon fusible link with a melting temperature of 75 ℃. A soft intumescent wrap, 4-mm thick x 57-mm wide and weighing approximately 60 grams lined the internal circumference of the collar. The collar was cast into the concrete slab with its base flush with the underside.

The penetrating service comprised a nominally 50-mm OD PE pipe of SDR7.4 with a wall thickness of 8-mm, fitted through the collar's sleeve. The pipe projected vertically, approximately 2000-mm above the concrete slab and approximately 500-mm into the furnace chamber. The pipe was supported at nominally 1000-mm from the unexposed face of the concrete slab. The pipe was open at the unexposed end and capped on the exposed end with a ceramic fibre plug.

DIMENSIONS

The overall dimensions of the concrete slab were 1150-mm x 1150-mm, to suit the opening in the specimen containing frame.

ORIENTATION

The reinforced concrete slab was placed horizontally on top of the furnace chamber and subjected to fire exposure from the underside.

DOCUMENTATION:

The following documents were supplied by the sponsor as a complete description of the specimen and should be read in conjunction with this report:

Drawings numbered PETESTSLAB-1 dated August 2009 and PEFLOORSLAB-2 dated 11 of August 2009, by Snap Fire Systems.

Confidential information about the test specimen has been submitted and is retained at CSIRO Materials Science and Engineering.

EQUIPMENT:

FURNACE

The furnace had a nominal opening of 1000-mm x 1000-mm for attachment of vertical or horizontal specimens.

The furnace was lined with refractory bricks and materials with the thermal properties as specified in AS 1530.4-2005 and was heated by combustion of a mixture of natural gas and air.

TEMPERATURE

The temperature in the furnace chamber was measured by four type K, 3-mm diameter, 310 stainless steel Mineral Insulated Metal Sheathed (MIMS) thermocouples. Each thermocouple was housed in high-nickel steel tubes opened at the exposed end.

The temperatures of the specimen were measured by glass-fibre insulated and sheathed K-type thermocouples with a wire diameter of 0.5-mm.

PRESSURE

The furnace pressure was measured by a differential low-pressure transducer with a range of ± 50 Pa.

MEASUREMENT SYSTEM

The primary measurement system comprised of multiple-channel data loggers, scanning at one minute intervals during the test.

AMBIENT TEMPERATURE:

The temperature of the test area was 11℃ at the commencement of the test.

DEPARTURE FROM STANDARD:

There were no departures from the requirements of AS 1530.4-2005.

TERMINATION OF TEST:

The test was terminated at 241 minutes by agreement with the sponsor.

TEST RESULTS:

CRITICAL OBSERVATIONS

The following observations were made during the fire-resistance test:

2 minutes -	Small amount of smoke is emitted from around the base of pipe #2.
	Small amount of smoke is fluing from pipe #5.
4 minutes -	Smoke is fluing from pipe #6. Smoke is no longer fluing from pipe #5.
7 minutes -	None of the pipes are fluing smoke. Smoke is emitted from around the base of pipes #2 & #4.
8 minutes -	Smoke is fluing from pipe #1.
10 minutes -	Smoke is fluing from pipe #4.

12 minutes -	No more smoke is fluing from pipe #4. Heavy smoke is fluing from pipe #2.
14 minutes -	Heavy smoke is fluing from pipes #1 & #4. No more smoke is fluing from pipe #2.
15 minutes -	Smoke has started to flue from pipe #2 again.
19 minutes -	Pipe#1 has ceased fluing smoke. Pipes #2 & #4 continue to flue smoke.
21 minutes -	Pipe #4 has ceased fluing smoke.
29 minutes -	No more smoke is fluing from pipe #2. None of the pipes are fluing smoke.
60 minutes -	No apparent change to the specimen.
103 minutes -	Pipe #2 starts to deform at its base (photograph 4).
127 minutes -	Pipe #4 starts to deform at its base (photograph 6).
140 minutes -	Smoke is fluing from pipe #2.
160 minutes -	Smoke is no longer fluing from pipe #2.
169 minutes -	Insulation failure of Penetration #2 – maximum temperature rise limit of 180 K is exceeded on the 150-mm thick concrete slab, 25-mm from the base of the pipe.
172 minutes -	Further deformation near the bases of pipes #2 & #4 is evident. Insulation failure of Penetration #4 – maximum temperature rise limit of 180 K is exceeded on the 150-mm thick concrete slab, 25-mm from the base of the pipe.
200 minutes -	Insulation failure of Penetration #1 – maximum temperature rise limit of 180 K is exceeded on the concrete slab, 25-mm from the base of the pipe.
207 minutes -	Pipe #1 is starting to deform at its base.
228 minutes -	Insulation failure of Penetration #4 – maximum temperature rise limit of 180 K is exceeded on the 170-mm thick concrete slab, 25-mm from the base of the pipe.
241 minutes -	Test terminated.

FURNACE TEMPERATURE

Figure 1 shows the standard curves of temperature versus time for heating the furnace chamber and the actual curves of average and maximum temperature versus time recorded during the heating period.

SPECIMEN TEMPERATURE

Figure 2 shows the curve of maximum temperature versus time associated with Penetration 1.

Figure 3 shows the curves of maximum temperatures versus time associated with Penetration 2.

Figure 4 shows the curve of maximum temperature versus time associated with Penetration 3.

Figure 5 shows the curves of maximum temperatures versus time associated with Penetration 4.

Figure 6 shows the curve of maximum temperature versus time associated with Penetration 5.

Figure 7 shows the curve of maximum temperature versus time associated with Penetration 6.

PERFORMANCE

Performance observed in respect of the following AS 1530.4-2005 criteria:

Penetration 1 – Cast-in SNAP (H/L) 100 FWS fire collar protecting a nominal 110-mm PE pipe

Structural adequacy	-	not applicable
Integrity	-	no failure at 241 minutes
Insulation	-	200 minutes

Penetration 2 – Cast-in SNAP METAL 160 fire collar protecting a nominal 160-mm PE pipe 150-mm thick slab

Structural adequacy	-	not applicable
Integrity	-	no failure at 241 minutes
Insulation	-	169 minutes

Penetration 2 – Cast-in SNAP METAL 160 fire collar protecting a nominal 160-mm PE pipe 175-mm thick slab

Structural adequacy	-	not applicable
Integrity	-	no failure at 241 minutes
Insulation	-	228 minutes

Penetration 3 – Cast-in SNAP (H/L) 100 FWS fire collar protecting a nominal 50-mm PE pipe

Structural adequacy	-	not applicable
Integrity	-	no failure at 241 minutes
Insulation	-	no failure at 241 minutes

Penetration 4 – Cast-in SNAP METAL 125 fire collar protecting a nominal 125-mm PE pipe150-mm thick slab

Structural adequacy	-	not applicable
Integrity	-	no failure at 241 minutes
Insulation	-	172 minutes

Penetration 4 – Cast-in SNAP METAL 125 fire collar protecting a nominal 125-mm PE pipe 175-mm thick slab

Structural adequacy	-	not applicable
Integrity	-	no failure at 241 minutes
Insulation	-	no failure at 241 minutes

Penetration 5 – Cast-in SNAP (H/L) 50 FWS fire collar protecting a nominal 20-mm PE pipe

Structural adequacy	-	not applicable
Integrity	-	no failure at 241 minutes
Insulation	-	no failure at 241 minutes

Penetration 6 – Cast-in SNAP (H/L) 50 FWS fire collar protecting a nominal 50-mm PE pipe

Structural adequacy	-	not applicable
Integrity	-	no failure at 241 minutes
Insulation	-	no failure at 241 minutes

This report details methods of construction, the test conditions and the results obtained when specific element of construction described herein was tested following the procedure outlined in this standard. Any significant variation with respect to size, constructional details, loads, stresses, edge or end conditions, other than those allowed under the field of direct application in the relevant test method, is not covered by this report.

Because of the nature of fire resistance testing and the consequent difficulty in quantifying the uncertainty of measurement of fire resistance, it is not possible to provide a stated degree of accuracy of the result.

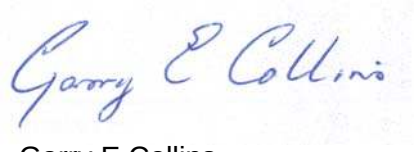
FIRE-RESISTANCE LEVEL (FRL):

For the purpose of building regulations in Australia, the FRL's of the test specimens were as follows:

Penetration 1	-/240/180;
Penetration 2 (150-mm thick concrete slab)	-/240/120;
Penetration 2 (175-mm thick concrete slab)	-/240/180;
Penetration 3	-/240/240;
Penetration 4 (150-mm thick concrete slab)	-/240/120;
Penetration 4 (175-mm thick concrete slab)	-/240/240;
Penetration 5	-/240/240 and
Penetration 6	-/240/240

For the purposes of AS 1530.4-2005 the results of these fire tests may be used to directly assess fire hazard, but it should be noted that a single test method will not provide a full assessment of fire hazard under all fire conditions.

TESTED BY:



Chris Wojcik
Testing Officer

Garry E Collins
Manager, Fire Testing and Assessments

4 September 2009

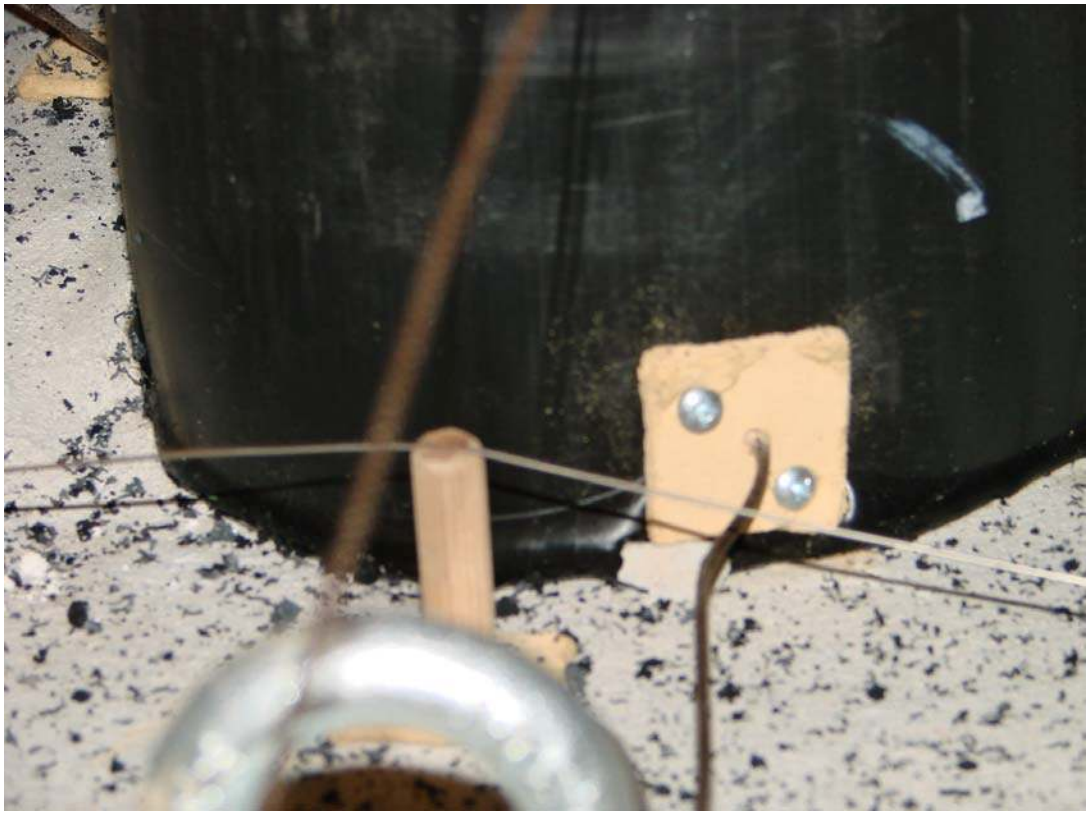
APPENDICES

APPENDIX 1

Photograph 1 – Exposed face of the specimen prior to testing

Photograph 2 – Unexposed face of the specimen prior to testing

Photograph 3 – Specimen after 60 minutes of testing



Photograph 4 – Pipe #2 at 103 minutes of testing

Photograph 5 – Specimen after 120 minutes of testing

Photograph 6 – Pipe #4 at 127 minutes of testing.

Photograph 7 – Specimen at 180 minutes of testing

Photograph 8 – Specimen at the conclusion of testing

Photograph 9 – Exposed face after the conclusion of testing

APPENDIX 2

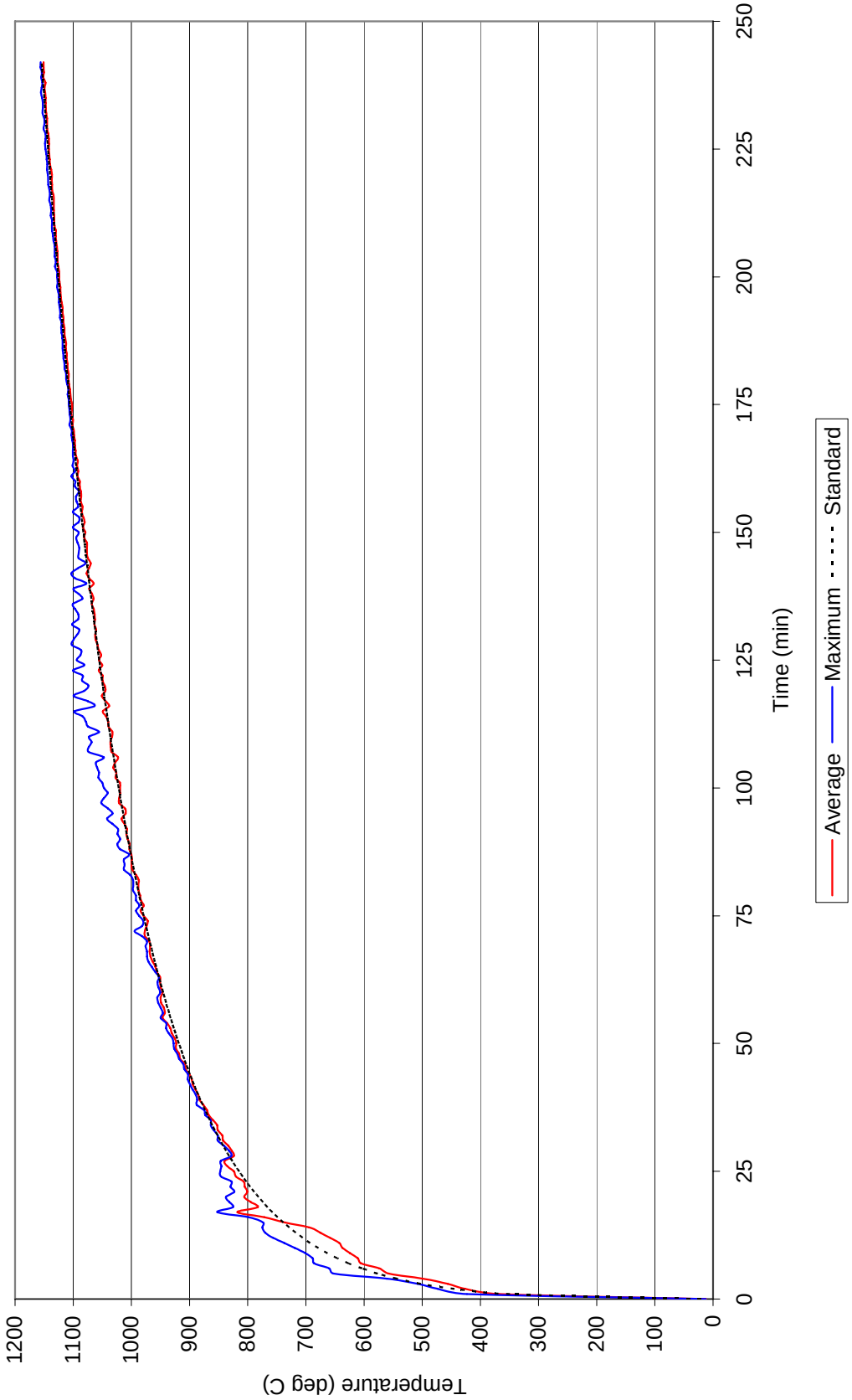


Figure 1 - Furnace temperature

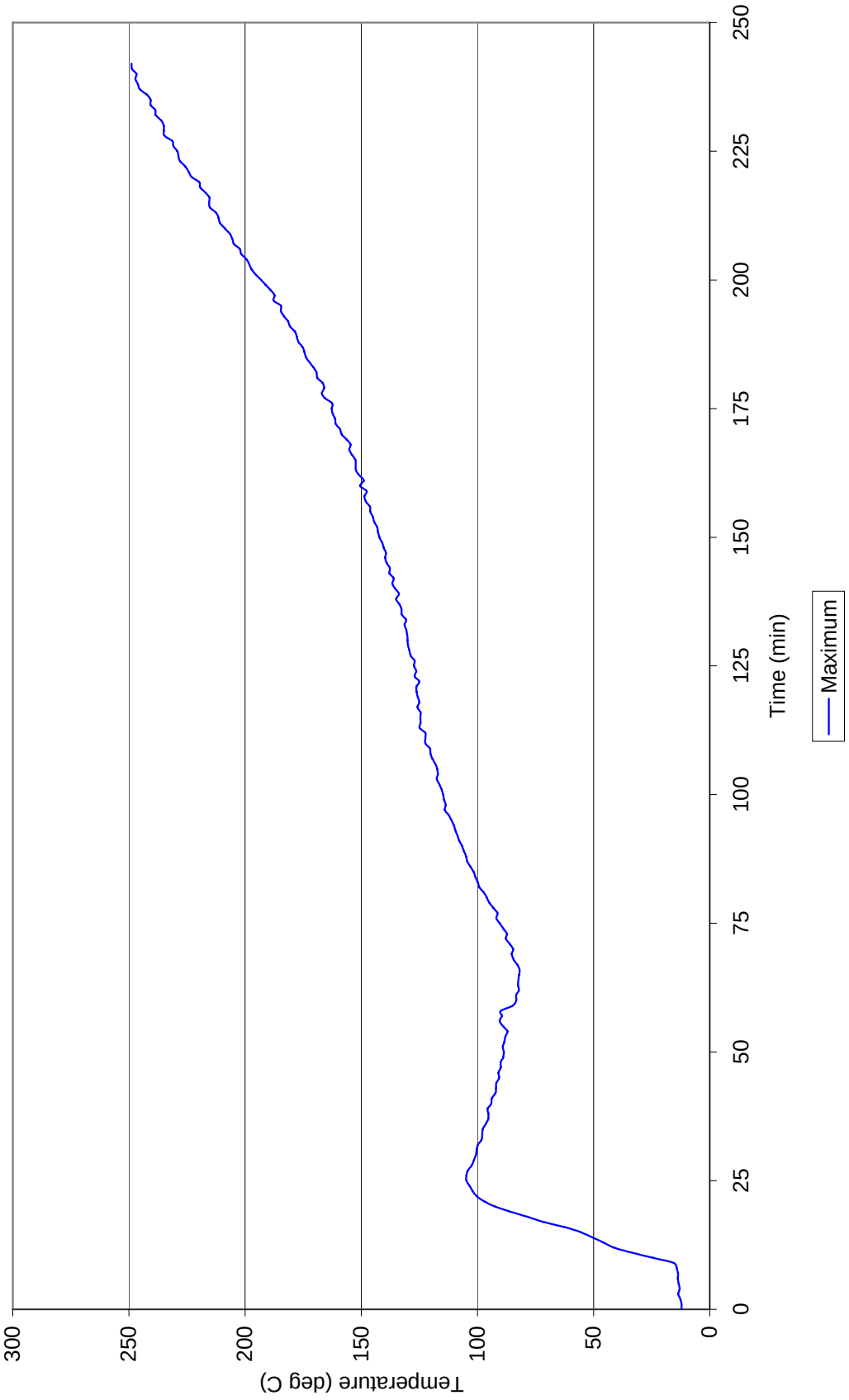


Figure 2 - Specimen temperature – Penetration 1

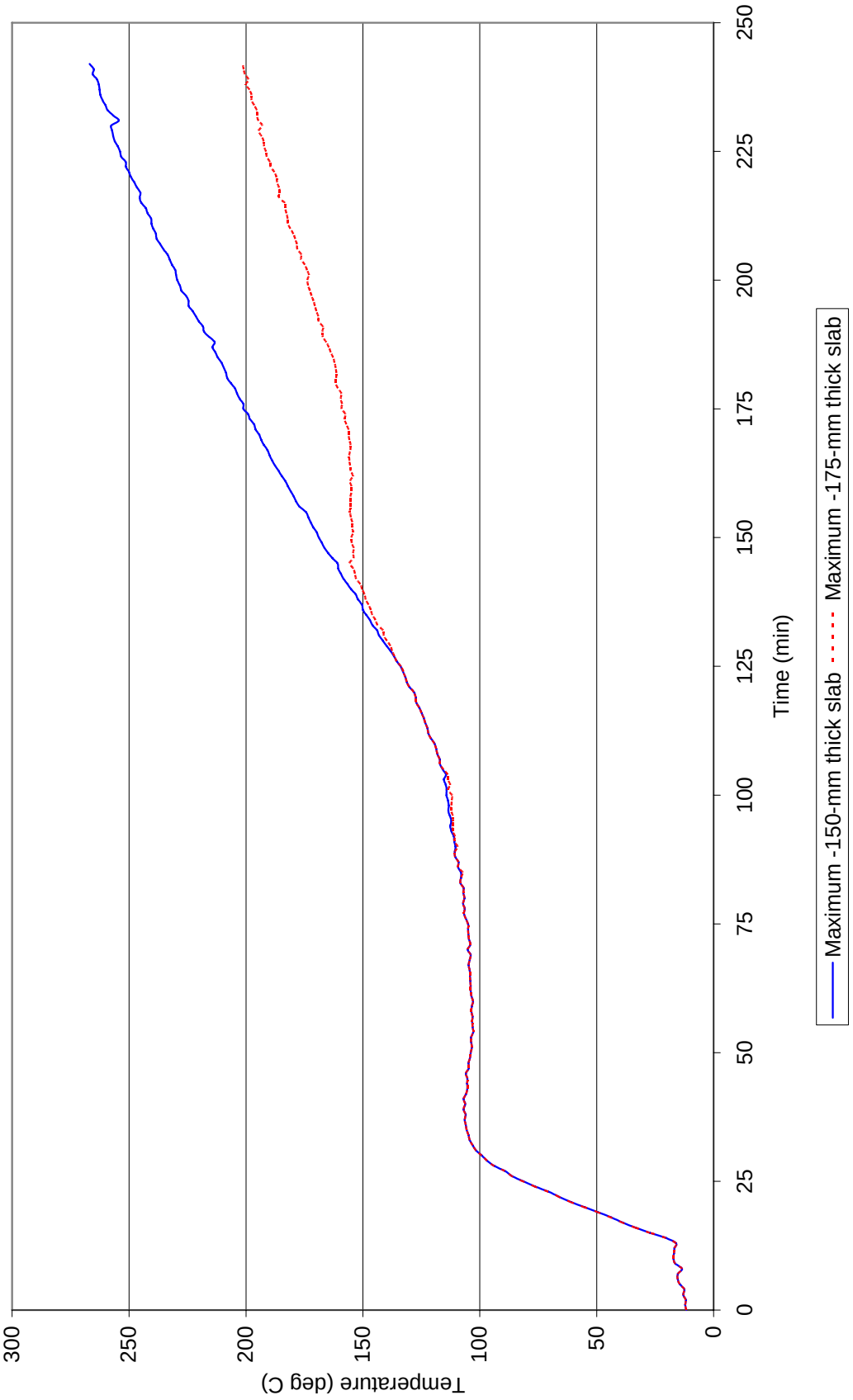


Figure 3 - Specimen temperature – Penetration 2

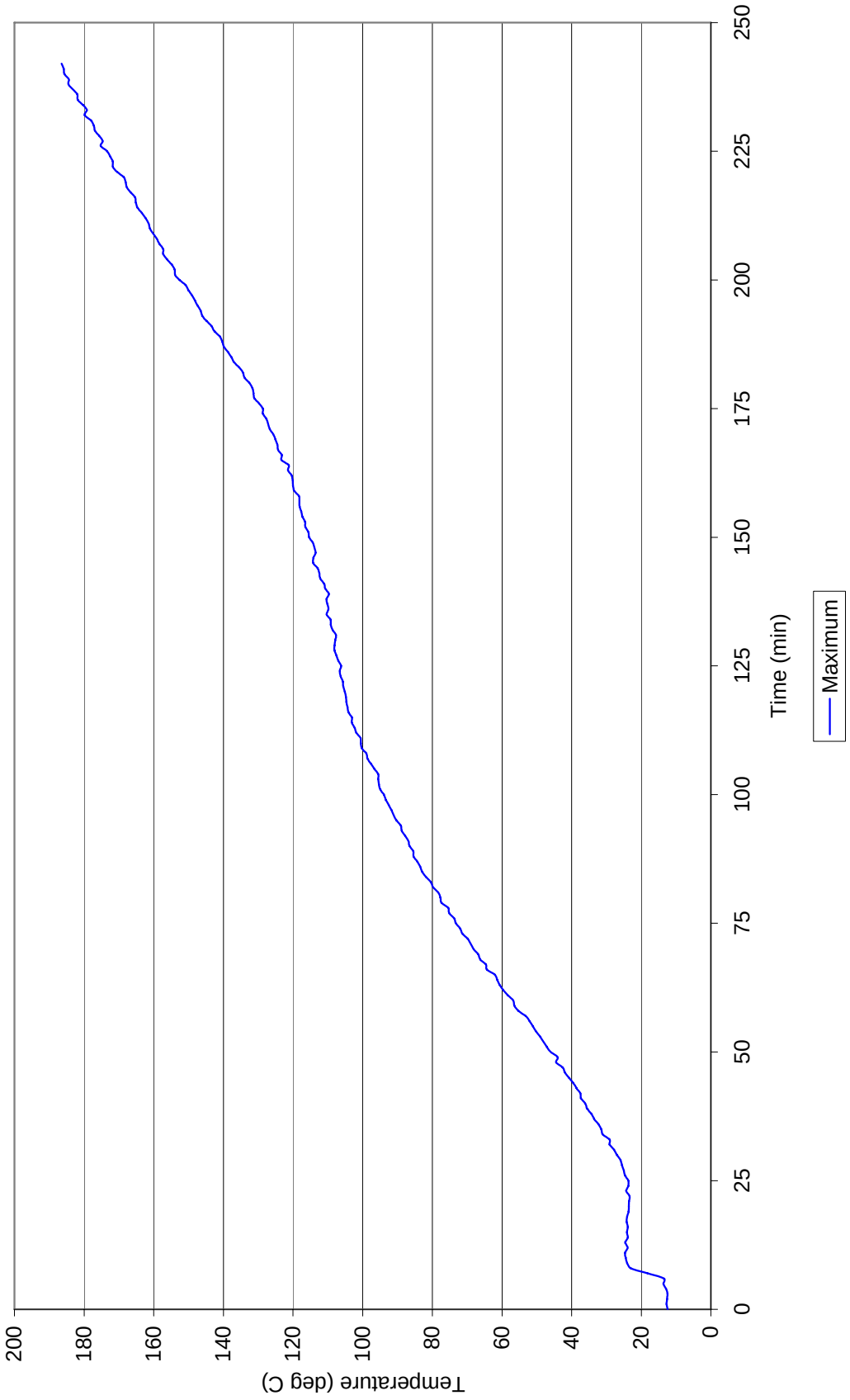


Figure 4 - Specimen temperature – Penetration 3

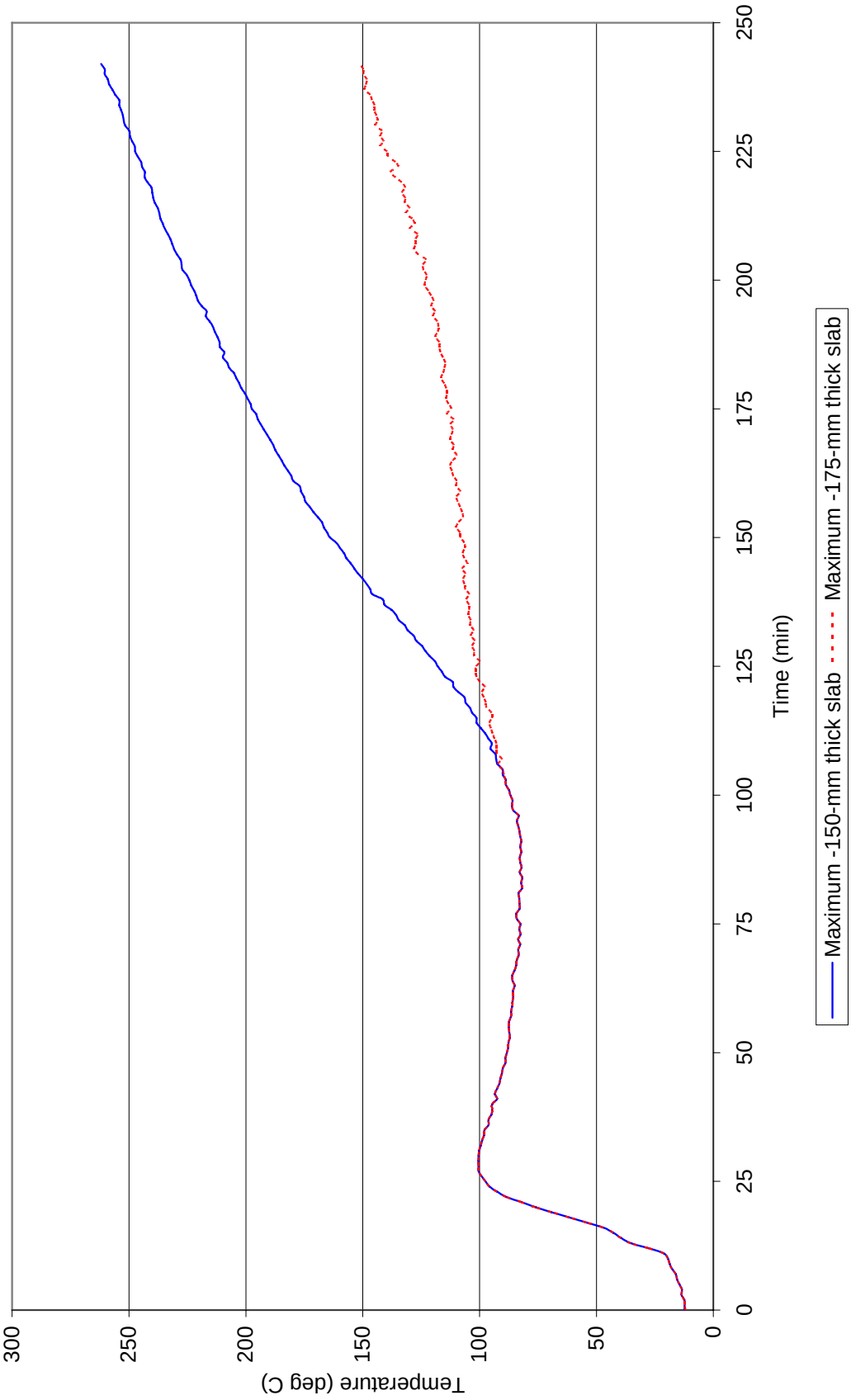


Figure 5 - Specimen temperature – Penetration 4

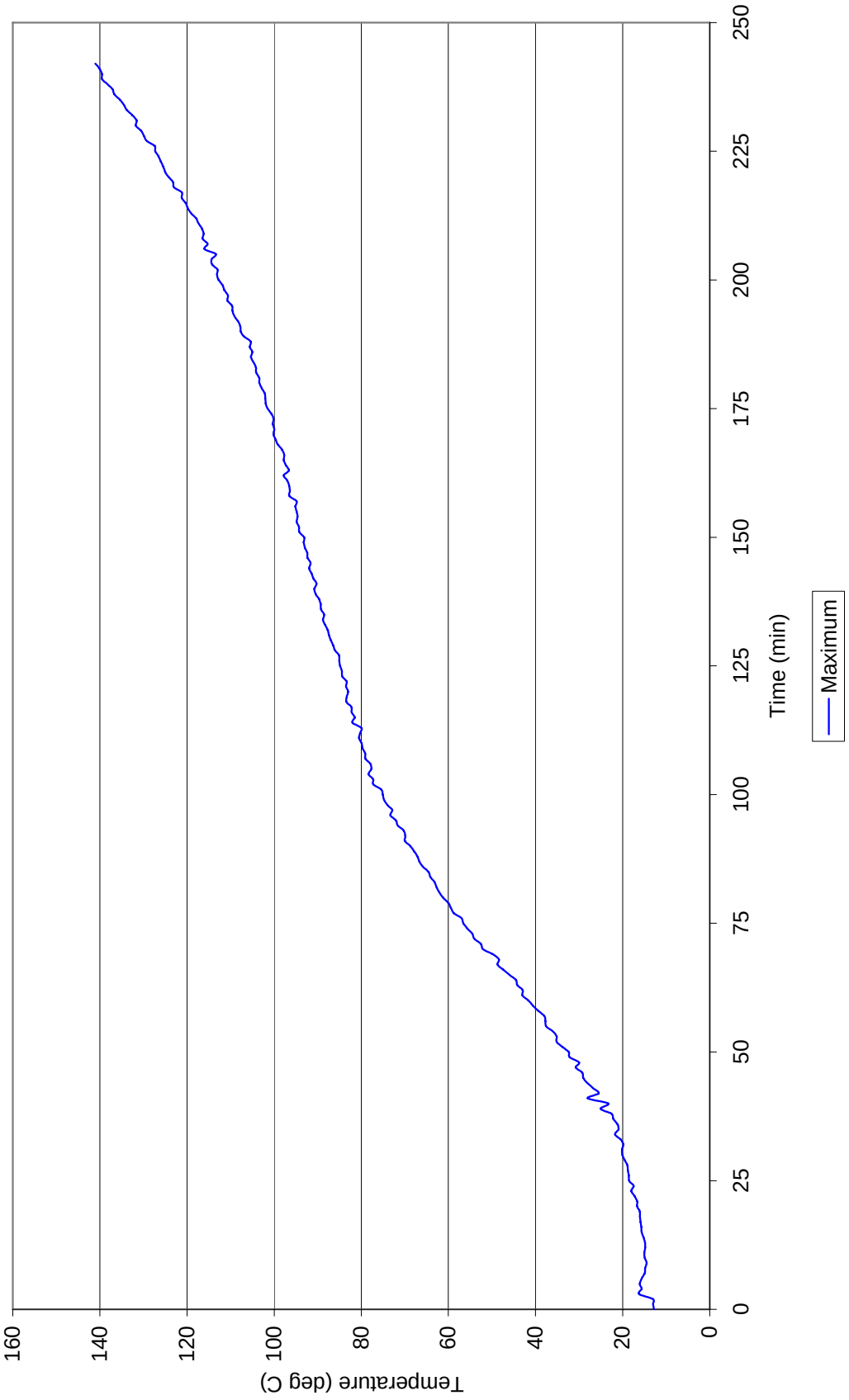


Figure 6 - Specimen temperature – Penetration 5

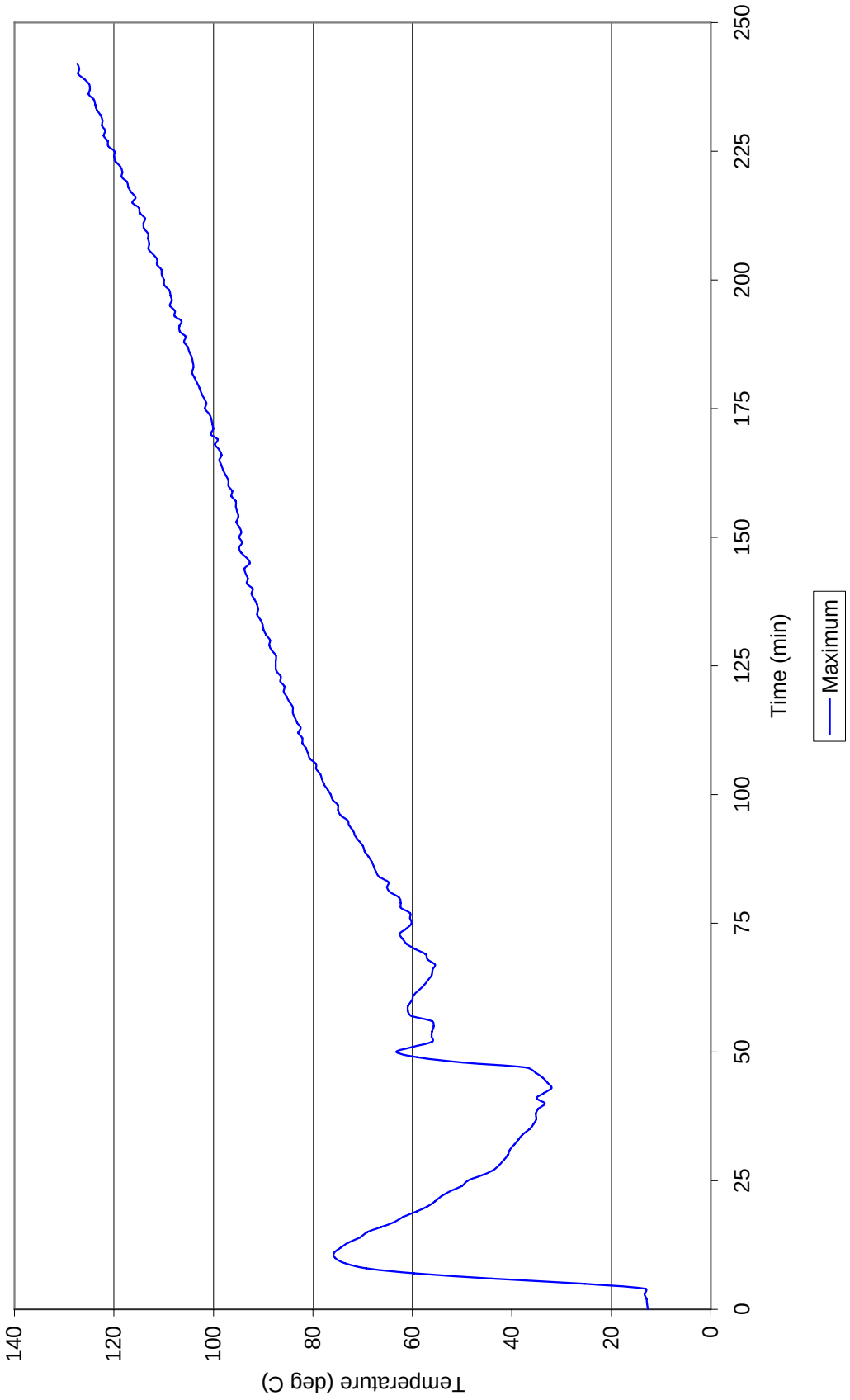
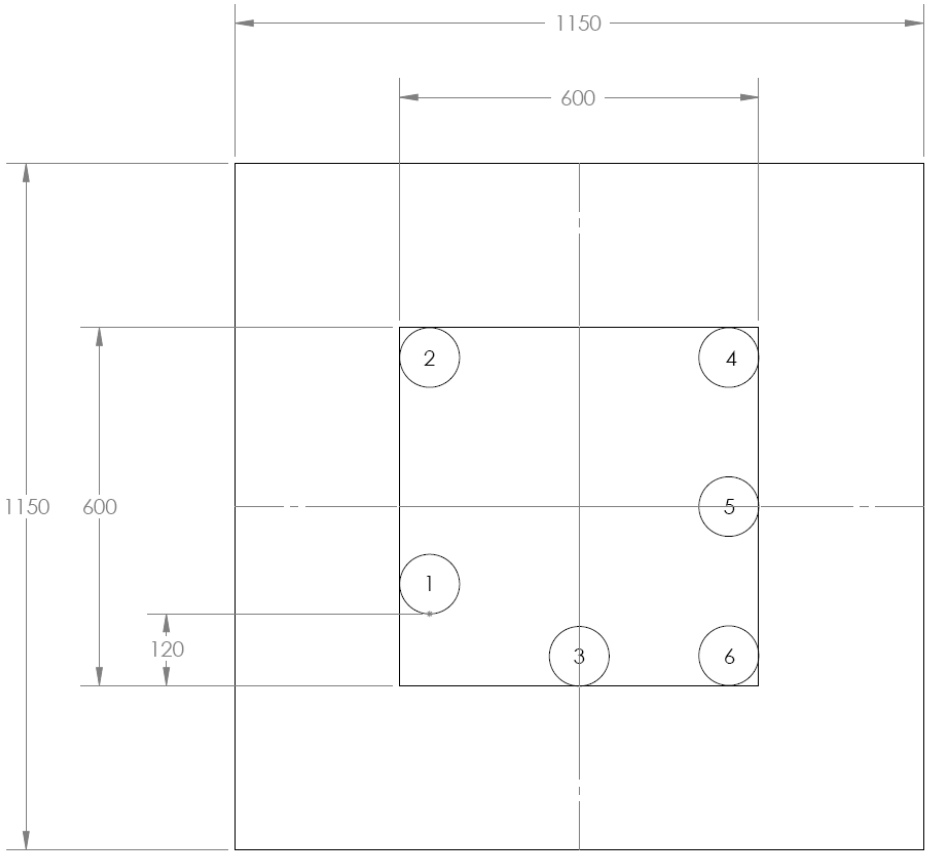
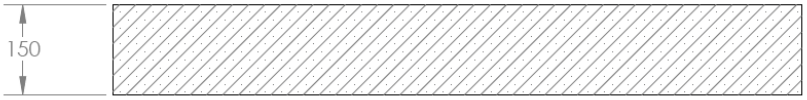


Figure 7 - Specimen temperature – Penetration 6

APPENDIX 3



TOP VIEW



FRONT VIEW

SDR	PIPE DESCRIPTION	PIPE DIAMETER	POSITION	COLLAR	TYPE
7.4	PE	110	1	100 PLASTIC	CAST-IN
7.4	PE	160	2	160 METAL	CAST-IN
7.4	PE	50	3	100 PLASTIC	CAST-IN
7.4	PE	125	4	125 METAL	CAST-IN
7.4	PE	20	5	50 PLASTIC	CAST-IN
7.4	PE	50	6	50 PLASTIC	CAST-IN

SNAP FIRE SYSTEMS

SNAP The only Smoke and Fire Collar

DWG No. PETESTSLAB-1

PE TEST SLAB
COLLAR / PIPE LOCATIONS

AUGUST 2009 SCALE 1:10

Drawing numbered PETESTSLAB-1, dated August 2009, by Snap Fire systems

Drawing numbered PEFLOORSLAB-2, dated 11/08/2009, by Snap Fire systems

APPENDIX 4

Certificate of Test

No. 2174

This is to certify that the element of construction described below was tested by the CSIRO Division of Material Science and Engineering in accordance with Australian Standard 1530, Methods for fire tests on building materials, components and structures, Part 4-2005 on behalf of:

Snap Fire Systems Pty Ltd
448 Newman road
Geebung QLD

A full description of the test specimen and the complete test results are detailed in the Division's sponsored investigation report numbered FSP 1367.

Product name: Penetration 1 – Cast-in SNAP (H/L) 100 FWS fire collar protecting a nominal 110-mm PE pipe

Description: The SNAP (H/L) 100 FWS fire collar consisted of a 1.5-mm thick polypropylene case, 140-mm diameter and 95-mm high, excluding the top cone. The total height of the collar was 285-mm. The collar incorporated three springs; these were pivoted at the top of the spring cavity and restrained by a nylon fusible link with a melting temperature of 75 °C. A soft intumescent wrap, 4-mm thick x 85-mm wide and weighing approximately 150 grams lined the internal circumference of the collar. The collar was cast into the concrete slab with its base flush with the underside.

The penetrating service comprised a nominally 110-mm OD PE pipe of SDR7.4 with a wall thickness of 15-mm, fitted through the collar's sleeve. The pipe projected vertically, approximately 2000-mm above the concrete slab and approximately 500-mm into the furnace chamber. The pipe was supported at nominally 1000-mm from the unexposed face of the concrete slab. The pipe was open at the unexposed end and capped on the exposed end with a ceramic fibre plug.

Structural Adequacy	-	not applicable
Integrity	-	no failure at 241 minutes
Insulation	-	200 minutes

and therefore for the purpose of Building Regulations in Australia, achieved a fire-resistance level (FRL) of -/240/180. The FRL is applicable for exposure to fire from the same side as tested. This certificate is provided for general information only and does not comply with the regulatory requirements for evidence of compliance.

Testing Officer: Chris Wojcik Date of Test: 13 August 2009.

Issued on the 4th day of September 2009 without alterations or additions.

Garry E Collins
Manager, Fire Testing and Assessments

CSIRO

CSIRO Materials Science and Engineering
14 Julius Avenue, Riverside Corporate Park, North Ryde NSW 2113 AUSTRALIA
Telephone: 61 2 9490 5444 Facsimile:61 2 9490 5555

NATA

This document is issued in accordance with NATA's accreditation requirements

Copy of Certificate of Test - No.2174

Certificate of Test

No. 2175

This is to certify that the element of construction described below was tested by the CSIRO Division of Material Science and Engineering in accordance with Australian Standard 1530, Methods for fire tests on building materials, components and structures, Part 4-2005 on behalf of:

Snap Fire Systems Pty Ltd
448 Newman road
Geebung QLD

A full description of the test specimen and the complete test results are detailed in the Division's sponsored investigation report numbered FSP 1367.

Product name: Penetration 2 – Cast-in SNAP METAL 160 fire collar protecting a nominal 160-mm PE pipe

Description: The SNAP METAL 160 fire collar consisted of a 1.2-mm thick steel case, 190-mm diameter and 130-mm high. The collar incorporated four springs; these were pivoted at the top of the spring cavity and restrained by a nylon fusible link with a melting temperature of 75 ℃. A soft intumescent wrap, 6-mm thick x 127-mm wide and weighing approximately 300 grams lined the internal circumference of the collar. The collar was cast into the concrete slab with its base flush with the underside. On the unexposed face of the concrete slab, a 25-mm high x 50-mm wide concrete hob was cast around half of the pipe's circumference, to increase the total thickness of the slab to approximately 175-mm.

The penetrating service comprised a nominally 160-mm OD PE pipe of SDR7.4 with a wall thickness of 23-mm, fitted through the collar's sleeve. The pipe projected vertically, approximately 2000-mm above the concrete slab and approximately 500-mm into the furnace chamber. The pipe was supported at nominally 1000-mm from the unexposed face of the concrete slab. The pipe was open at the unexposed end and capped on the exposed end with a ceramic fibre plug.

	150-mm thick concrete slab	
Structural adequacy	-	not applicable
Integrity	-	no failure at 241 minutes
Insulation	-	169 minutes

	175-mm thick concrete slab	
Structural adequacy	-	not applicable
Integrity	-	no failure at 241 minutes
Insulation	-	228 minutes

and therefore for the purpose of Building Regulations in Australia, achieved a fire-resistance level (FRL) of -/240/120 on the 150-mm thick concrete slab and -/240/180 on the 175-mm thick concrete slab. The FRL is applicable for exposure to fire from the same side as tested. This certificate is provided for general information only and does not comply with the regulatory requirements for evidence of compliance.

Testing Officer: Chris Wojcik Date of Test: 13 August 2009.

Issued on the 4th day of September 2009 without alterations or additions.

Garry E Collins
Manager, Fire Testing and Assessments

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14 Julius Avenue, Riverside Corporate Park, North Ryde NSW 2113 AUSTRALIA
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No. 2176

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Snap Fire Systems Pty Ltd
448 Newman road
Geebung QLD

A full description of the test specimen and the complete test results are detailed in the Division's sponsored investigation report numbered FSP 1367.

Product name: Penetration 3 – Cast-in SNAP (H/L) 100 FWS fire collar protecting a nominal 50-mm PE pipe

Description: The SNAP (H/L) 100 FWS fire collar consisted of a 1.5-mm thick polypropylene case, 140-mm diameter and 95-mm high, excluding the top cone. The total height of the collar was 285-mm. The collar incorporated three springs; these were pivoted at the top of the spring cavity and restrained by a nylon fusible link with a melting temperature of 75 ℃. A soft intumescent wrap, 4-mm thick x 85-mm wide and weighing approximately 150 grams lined the internal circumference of the collar. The collar was cast into the concrete slab with its base flush with the underside.

The penetrating service comprised a nominally 50-mm OD PE pipe of SDR7.4 with a wall thickness of 8-mm, fitted through the collar's sleeve. The pipe projected vertically, approximately 2000-mm above the concrete slab and approximately 500-mm into the furnace chamber. The pipe was supported at nominally 1000-mm from the unexposed face of the concrete slab. The pipe was open at the unexposed end and capped on the exposed end with a ceramic fibre plug.

Structural Adequacy	-	not applicable
Integrity	-	no failure at 241 minutes
Insulation	-	no failure at 241 minutes

and therefore for the purpose of Building Regulations in Australia, achieved a fire-resistance level (FRL) of -/240/240. The FRL is applicable for exposure to fire from the same side as tested. This certificate is provided for general information only and does not comply with the regulatory requirements for evidence of compliance.

Testing Officer: Chris Wojcik Date of Test: 13 August 2009.

Issued on the 4th day of September 2009 without alterations or additions.

Garry E Collins
Manager, Fire Testing and Assessments

CSIRO

CSIRO Materials Science and Engineering
14 Julius Avenue, Riverside Corporate Park, North Ryde NSW 2113 AUSTRALIA
Telephone: 61 2 9490 5444 Facsimile:61 2 9490 5555

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Copy of Certificate of Test - No.2176

Certificate of Test

No. 2177

This is to certify that the element of construction described below was tested by the CSIRO Division of Material Science and Engineering in accordance with Australian Standard 1530, Methods for fire tests on building materials, components and structures, Part 4-2005 on behalf of:

Snap Fire Systems Pty Ltd
448 Newman road
Geebung QLD

A full description of the test specimen and the complete test results are detailed in the Division's sponsored investigation report numbered FSP 1367.

Product name: Penetration 4 – Cast-in SNAP METAL 125 fire collar protecting a nominal 125-mm PE pipe

Description: The SNAP METAL 125 fire collar consisted of a 1.2-mm thick steel case, 140-mm diameter and 130-mm high. The collar incorporated four springs; these were pivoted at the top of the spring cavity and restrained by a nylon fusible link with a melting temperature of 75 ℃. A soft intumescent wrap, 6-m m thick x 127-mm wide and weighing approximately 250 grams lined the internal circumference of the collar. The collar was cast into the concrete slab with its base flush with the underside. On the unexposed face of the concrete slab, a 25-mm high x 50-mm wide concrete hob was cast around half of the pipe's circumference, to increase the total thickness of the slab to approximately 175-mm.

The penetrating service comprised a nominally 125-mm OD PE pipe of SDR7.4 with a wall thickness of 18-mm, fitted through the collar's sleeve. The pipe projected vertically, approximately 2000-mm above the concrete slab and approximately 500-mm into the furnace chamber. The pipe was supported at nominally 1000-mm from the unexposed face of the concrete slab. The pipe was open at the unexposed end and capped on the exposed end with a ceramic fibre plug.

	150-mm thick concrete slab	
Structural adequacy	-	not applicable
Integrity	-	no failure at 241 minutes
Insulation	-	172 minutes

	175-mm thick concrete slab	
Structural adequacy	-	not applicable
Integrity	-	no failure at 241 minutes
Insulation	-	no failure at 241 minutes

and therefore for the purpose of Building Regulations in Australia, achieved a fire-resistance level (FRL) of -/240/120 on the 150-mm thick concrete slab and -/240/240 on the 175-mm thick concrete slab. The FRL is applicable for exposure to fire from the same side as tested. This certificate is provided for general information only and does not comply with the regulatory requirements for evidence of compliance.

Testing Officer: Chris Wojcik Date of Test: 13 August 2009.

Issued on the 4th day of September 2009 without alterations or additions.

Garry E Collins
Manager, Fire Testing and Assessments

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Copy of Certificate of Test - No.2177

Certificate of Test

No. 2178

This is to certify that the element of construction described below was tested by the CSIRO Division of Material Science and Engineering in accordance with Australian Standard 1530, Methods for fire tests on building materials, components and structures, Part 4-2005 on behalf of:

Snap Fire Systems Pty Ltd
448 Newman road
Geebung QLD

A full description of the test specimen and the complete test results are detailed in the Division's sponsored investigation report numbered FSP 1367.

Product name: Penetration 5 – Cast-in SNAP (H/L) 50 FWS fire collar protecting a nominal 20-mm PE pipe

Description: The SNAP (H/L) 50 FWS fire collar consisted of a 1.5-mm thick polypropylene case, 78-mm diameter and 75-mm high, excluding the top cone. The total height of the collar was 182-mm. The collar incorporated three springs; these were pivoted at the top of the spring cavity and restrained by a nylon fusible link with a melting temperature of 75 ℃. A soft intumescent wrap, 4-mm thick x 57-mm wide and weighing approximately 60 grams lined the internal circumference of the collar. The collar was cast into the concrete slab with its base flush with the underside.

The penetrating service comprised a nominally 20-mm OD PE pipe of SDR7.4 with a wall thickness of 4-mm, fitted through the collar's sleeve. The pipe projected vertically, approximately 2000-mm above the concrete slab and approximately 500-mm into the furnace chamber. The pipe was supported at nominally 1000-mm from the unexposed face of the concrete slab. The pipe was open at the unexposed end and capped on the exposed end with a ceramic fibre plug.

Structural Adequacy	-	not applicable
Integrity	-	no failure at 241 minutes
Insulation	-	no failure at 241 minutes

and therefore for the purpose of Building Regulations in Australia, achieved a fire-resistance level (FRL) of -/240/240. The FRL is applicable for exposure to fire from the same side as tested. This certificate is provided for general information only and does not comply with the regulatory requirements for evidence of compliance.

Testing Officer: Chris Wojcik Date of Test: 13 August 2009.

Issued on the 4th day of September 2009 without alterations or additions.

Garry E Collins
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Certificate of Test

No. 2179

This is to certify that the element of construction described below was tested by the CSIRO Division of Material Science and Engineering in accordance with Australian Standard 1530, Methods for fire tests on building materials, components and structures, Part 4-2005 on behalf of:

Snap Fire Systems Pty Ltd
448 Newman road
Geebung QLD

A full description of the test specimen and the complete test results are detailed in the Division's sponsored investigation report numbered FSP 1367.

Product name: Penetration 6 – Cast-in SNAP (H/L) 50 FWS fire collar protecting a nominal 50-mm PE pipe

Description: The SNAP (H/L) 50 FWS fire collar consisted of a 1.5-mm thick polypropylene case, 78-mm diameter and 75-mm high, excluding the top cone. The total height of the collar was 182-mm. The collar incorporated three springs; these were pivoted at the top of the spring cavity and restrained by a nylon fusible link with a melting temperature of 75 ℃. A soft intumescent wrap, 4-mm thick x 57-mm wide and weighing approximately 60 grams lined the internal circumference of the collar. The collar was cast into the concrete slab with its base flush with the underside.

The penetrating service comprised a nominally 50-mm OD PE pipe of SDR7.4 with a wall thickness of 8-mm, fitted through the collar's sleeve. The pipe projected vertically, approximately 2000-mm above the concrete slab and approximately 500-mm into the furnace chamber. The pipe was supported at nominally 1000-mm from the unexposed face of the concrete slab. The pipe was open at the unexposed end and capped on the exposed end with a ceramic fibre plug.

Structural Adequacy	-	not applicable
Integrity	-	no failure at 241 minutes
Insulation	-	no failure at 241 minutes

and therefore for the purpose of Building Regulations in Australia, achieved a fire-resistance level (FRL) of -/240/240. The FRL is applicable for exposure to fire from the same side as tested. This certificate is provided for general information only and does not comply with the regulatory requirements for evidence of compliance.

Testing Officer: Chris Wojcik Date of Test: 13 August 2009.

Issued on the 4th day of September 2009 without alterations or additions.

Garry E Collins
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